WHAT IS CLAIMED IS:

1. A composition of mammalian leukemia stem cells, wherein at least 50% of the cells in said composition are said leukemia stem cells (LSC).

2. The composition according to Claim 1, wherein at least 75% of the cells in said composition are LSC.

3. The composition according to Claim 1, wherein said LSC are human cells.

4. The composition according to Claim 3, wherein said LSC have the cell surface phenotype of a hematopoietic progenitor cell, but have acquired an activated β–catenin pathway.

5. The composition according to Claim 4, wherein said cells are Thy-1$^-$, IL-7Rα (CD127)$^-$, and lineage panel$^-$.

6. The composition of Claim 5, wherein said cells are further characterized as IL-3Rα^{lo} CD45RA$^+$.

7. The composition of Claim 6, wherein said granulocyte monocyte committed progenitor cells are mouse cells and are further characterized as FcγR$^+$CD34$^+$.

8. A method of enrichment for a composition of LSC, the method comprising:

combining reagents that specifically recognize Thy-1, IL-7Rα (CD127), and a lineage panel with a sample suspected of comprising LSC; and

selecting for those cells that are Thy-1$^-$, IL-7Rα (CD127)$^-$, and lineage panel$^-$.

9. The method according to Claim 8, wherein said sample is a blood sample from a leukemia patient.

10. The method according to Claim 9, wherein said leukemia patient is a chronic myelogenous leukemia patient.

11. A method for the identification of LSC, the method comprising:

introducing into a sample of leukemia cells a nucleic acid construct comprising sequences encoding a detectable marker, which marker is operably linked to a transcriptional

response element regulated by β-catenin;

detecting the presence of expression of said detectable marker,

wherein expression of said marker is indicative that a cell is an LSC cell.

12. The method according to Claim 11, wherein said marker is a fluorescence producing protein.

13. The method according to Claim 12, wherein said transcriptional response element regulated by β-catenin is a LEF-1/TCF binding sequence.

14. The method according to Claim 13, further comprising the step of selecting for cells expressing said detectable marker.

15. A method of phenotyping a leukemic condition, the method comprising:

combining a hematologic sample from a patient suspected of said leukemic condition with specific binding members that are sufficient to distinguish the distribution of cells with hematopoietic stem and progenitor subsets;

determining the distribution of progenitor cells between said subsets,

wherein the distribution of progenitor cells is indicative of the phenotype of said leukemic condition.

16. The method according to Claim 15, wherein said leukemic condition is MDS.

17. The method according to Claim 15, wherein said leukemic condition is a myeloid leukemia.

18. The method according to Claim 15, wherein said myeloid leukemia is CML or CMML.

19. The method according to Claim 15, wherein said hematopoietic stem and progenitor subsets include one or more of HSC, CMP, MEP and GMP.

20. The method according to Claim 15, wherein said specific binding members are antibodies.

21. The method according to Claim 20, wherein said antibodies include specificities for CD34 and CD38.

22. The method according to Claim 21, wherein said antibodies further include specificities for IL-3R and CD45RA.

23. The method according to Claim 21, further comprising antibodies specific for a lineage panel.

24. A kit for use in any of the methods set forth in Claims 1-23.

25. A method of screening a candidate chemotherapeutic agent for effectiveness against an LSC, the method comprising:

contacting said agent with the cell composition of Claim 1, and

determining the effectiveness of said agent against said LSC.

26. A method of inhibiting the proliferation of an LSC, the method comprising:

contacting said LSC with an agent that inhibit the Wnt/β-catenin pathway.

27. The method according to Claim 26, wherein said agent comprises axin, a polynucleotide encoding axin and operably linked to a transcriptional regulatory element expressed in said LSC, or a mimetic of axin.